

Total No. of Questions : 8]

PB-3839

SEAT No. :

[Total No. of Pages : 2

[6262]-101

T.E. (E& TC Engineering)

POWER DEVICES & CIRCUITS

(2019 Pattern) (Semester - II) (304194)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Answer Q1 or Q2, Q3 or Q4, Q5 or Q6 and Q7 or Q8.
- 2) Neat diagrams and waveforms must be drawn wherever necessary.
- 3) Figures to the right side indicate full marks.
- 4) Use of non programmable calculator is allowed.
- 5) Assume Suitable data if necessary.

- Q1)** a) Explain working of single phase full bridge inverter for R load with input & output waveforms. Derive an expression for rms o/p voltage. [7]
- b) The single-phase half-bridge inverter has a resistive load of $R = 2.4 \Omega$ and the dc input voltage is $V_s = 48V$. Determine (a) the rms output voltage at the fundamental frequency V_{o1} , (b) the output power P_o , (c) the average and peak currents of each transistor. [6]
- c) Explain effect of Cross conduction in inverter. [4]

OR

- Q2)** a) Draw a three phase inverter for balanced star R load. Explain its operation of 180° mode with gate signals & output waveforms. [12]
- b) Compare 120° mode with 180° mode in three phase bridge inverter. [5]
- Q3)** a) Give classification of choppers? Explain operation of two quadrant chopper with circuit diagram. [6]
- b) Explain various control strategies in DC chopper. [6]
- c) Explain with block schematic working of SMPS. [6]

OR

P.T.O.

- Q4)** a) Explain with neat diagram the operation of 4 quadrant chopper with dc motor as a load. [8]
- b) The step down dc chopper has a resistive load of $R = 10\Omega$ and the input voltage is $V_s = 220\text{ V}$. When the converter switch remains on, its voltage drop is $V_{ch} = 2\text{ V}$ and the chopping frequency is $f = 1\text{ kHz}$. If the duty cycle is 50%, determine (a) the average output voltage V_a , (b) the rms output voltage V_o , (c) the converter efficiency. [6]
- c) Compare step up & step down choppers. [4]

- Q5)** a) Explain with neat diagram working of snubber circuit used in power devices protection. [7]
- b) Explain with neat diagram working of isolation transformer. [4]
- c) What is EMI? Explain various sources & minimizing techniques of EMI [6]

OR

- Q6)** a) What is the need of resonant converter? Explain ZCS resonant converter with circuit & waveforms. [8]
- b) Explain the role of heat sink? Draw its thermal equivalent circuit. [5]
- c) Compare resonant converters. ZVS with ZCS. [4]

- Q7)** a) Explain single phase full converter drive for single phase separately excited dc motor. [6]
- b) Explain operation of On-line UPS with block schematic. [6]
- c) Explain with neat diagram variable voltage type three phase induction motor drive. [6]

OR

- Q8)** a) Draw & explain single phase full wave ac voltage controller for resistive load with o/p voltage waveforms. [6]
- b) Explain with diagram architecture of EVs battery charger. [6]
- c) Explain working of electronic ballast with block schematic. [6]

